REMARKS

Responsive to the Office Action mailed September 23, 2005, Applicants have studied the Examiner's comments and the cited art. Claims 8-25 are currently pending. In view of the following remarks, Applicants respectfully submit that the application is in condition for allowance.

Attorney Docket Number

Please change the attorney docket number for this application to H052745.0001US0.

Amendments

The Office Action objects to claims 18–25 on the grounds that claim 1 fails to provide antecedent basis for "the vehicle." Applicants have amended claim 18 to replace references to "the vehicle" with references to "the heavy-duty materials handling apparatus." For this reason, Applicants respectfully request withdrawal of the objections.

Claim Rejections Under 35 U.S.C. § 103

Claims 18–25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tate, Jr., et al, U.S. Patent No. 6,653,817 B2. Applicants respectfully traverse the rejections.

Tate fails to teach or suggest a generator that is driven by an engine, where that generator in turn produces a voltage that is switched to drive a switched reluctance (SR) motor for driving a wheel of a heavy-duty materials handling apparatus. Tate recites the use of a motor generator (MoGen) 20 in the hybrid automotive vehicle 14.[1] The MoGen 20 functions as a generator when the internal combustion engine (ICE) 22 is running or during regeneration (such as during braking). The MoGen 20 also functions as a motor to propel the vehicle 14. But at no time does the MoGen 20 function as a generator to drive a separate SR motor. Instead, when functioning as a generator, the MoGen 20 generates energy that is stored in the battery pack 16 or that powers other electrical equipment of the vehicle 14.[2] Similarly, when the MoGen 20 is used as a motor to propel the vehicle 14, the MoGen 20 is driven by voltage from the battery pack 16, not a generator. The MoGen 20 of Tate cannot simultaneously function as a generator and a motor, and Tate does not teach or suggest the use of separate electric motors driven by a generator, which is in turn driven by the engine 22. Therefore, Tate fails to teach or suggest Applicants' claimed subject matter.

Further, as the Office Action admits, Tate fails to teach or suggest a heavy-duty materials handling apparatus. As is well-known to a person skilled in the art, hybrid vehicles such as recited by Tate have not been capable of use for heavy-duty materials handling apparatus because the battery packs that would be required to power electric traction motors for a heavy-duty materials handling apparatus would be too large and heavy for successful use, even if a battery pack of the necessary size were possible to manufacture, which Applicants do not admit. Therefore, one of ordinary skill in the art would not consider it obvious to use the hybrid vehicle technology recited by Tate, which focuses on a technique for determining the state of charge of the battery pack 16, in a heavy-duty material handling apparatus.

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[1] Fig. 2, Col. 3, line 58-Col. 4, line 33.
[2] Col. 4, lines 16-32.

For at least these reasons, Applicants respectfully request withdrawal of the rejections.

Tate is also non-analogous art to that of a heavy-duty materials handling apparatus. Hybrid vehicles are not in the same field of endeavor as heavy-duty materials handling devices. The hybrid vehicle field is concerned primarily with fuel economy and emissions levels, as suggested by Tate.[3] In contrast, the field of heavy-duty materials handling apparatus is primarily concerned with the provision of high power levels, ruggedness, power distribution, system coordination, operator interfaces, and efficiency. One of skill in the art would not consider hybrid vehicle technology, which is typically used in relatively smaller and low-powered automobiles, when considering design problems for a heavy-duty materials handling apparatus. As explained above, battery pack size and power issues have prevented use of hybrid technology and heavy-duty materials handling apparatus, thus Tate's hybrid technology would not be reasonably pertinent to the problems faced by one of ordinary skill in the art of heavy-duty materials handling apparatus. Because Tate is not in the field of endeavor of heavy-duty materials handling apparatus, and the disclosure of Tate would not be reasonably pertinent to the problems faced by one of ordinary skill in the field of heavy-duty materials handling apparatus, Tate is non-analogous art and is not proper as a reference against Applicants' claimed subject matter. For these additional reasons, Applicants respectfully request withdrawal of the rejections.

Claims 19-25 depend from allowable claim 18 and are therefore also allowable. For at least this reason, Applicants respectfully request withdrawal of the rejections.

With respect to claim 20, Tate fails to teach or suggest "running the engine at a substantially constant RPM," as in Applicants' claimed subject matter. For this additional reason, Applicants respectfully request withdrawal of the rejection.

With respect to claim 21, Tate does not teach or suggest dissipating excess power when slowing the SR motor from a predetermined speed, as in Applicants' claimed subject matter, but instead simply indicates that the MoGen 20 when in a regeneration state sends current to the battery pack 16. Because regeneration is important to maintaining the state of charge in the battery pack 16, one of skill in the art would not consider dissipation as in Applicants' claimed subject matter. For this additional reason, Applicants respectfully request withdrawal of the rejection.

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[3] Col. 1, lines 25-39.

With respect to claim 22, the Office Action asserts that "SR motors conventionally have a plurality of poles."[4] Applicants respectfully submit that whether SR motors conventionally have a plurality of poles does not address the steps of Applicants' claim 22, which recite "energizing less than all of the poles of the SR motor; holding the motor in a predetermined rotational position."[5] Because Tate fails to teach or suggest such an operation of the SR motor, Tate does not teach or suggest Applicants' claimed subject matter. For this additional reason, Applicants respectfully request withdrawal of the rejection.

With respect to claim 23, the Office Action admits that Tate does not recite the motors as able to reverse, but takes official notice that "conventional motors are able to reverse and it would have been obvious to one having ordinary skill in the art at the time of the invention to have used reversible SR motors with the vehicle of Tat [sic], Jr., et al. in order to allow the vehicle to go in reverse."[6] Applicants respectfully submit that one skilled in the art would recognize that the transmission[7] of a vehicle is typically used to reverse the operation of the vehicle, instead of reversing the operation of the MoGen 20 of Tate. As recited by Tate, the MoGen 20 serve as generators when reversed, and do not serve to propel the hybrid vehicle 14 in a reverse direction. Using the MoGen 20 to drive the wheels of the hybrid vehicle 14 when reversing the MoGen 20 would not be acceptable for Tate, because the MoGen 20 would not be able to serve in generator mode as is required for regeneration or charging of the battery pack 16 in a hybrid vehicle. Therefore, reversing the MoGen 20 to reverse the wheels of the hybrid vehicle 14 would destroy the principal mode of operation of Tate. For these additional reasons, Applicants respectfully request withdrawal of the rejection.

CONCLUSION

Applicants respectfully submit that all issues and rejections have been adequately addressed, that all claims are allowable, and that the case should be advanced to issuance.

If the Examiner has any questions or wishes to discuss the claims, Applicants encourage the Examiner to call the undersigned at the telephone number indicated below.

Respectfully submitted,

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[4] Paper 20050918, page 3.
[5] Claim 22.
[6] Paper 20050918, page 3.
[7] Not numbered in Tate Fig. 2, but labeled "Trans."

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